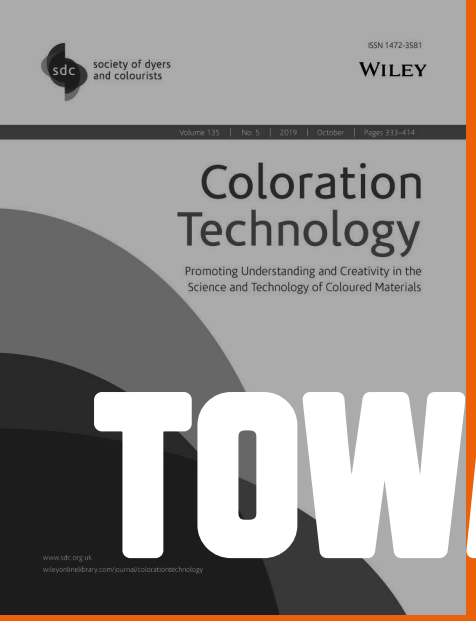

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TOWARDS THE DESIGN OF A BLENDING SYSTEM FOR PRECOLOURED FIBRES

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ADDITIONAL INFORMATION STATEMENT

This peer-reviewed research paper, accepted for publication by Coloration Technology, addresses key research questions relating to the development of a commercially viable blending system for pre-coloured fibre blends. This includes determining the maximum colour difference between blend components, the effect of composition on blend appearance (loose stock fibre, yarn, knitted) and the number of colours (primaries) required to cover a given area of colour space.

To date, the blending of multiple primaries has predominately related to the intentional creation of melange blends. The method of blending multiple primaries to create blends which appear as one colour is less understood.

In order to answer the research questions, the authors produced 4-colour fibre blends in loose stock, yarn and knitted form. The samples were assessed using controlled, psychophysical experiments, and the results used to determine the mean colour difference required between blend components (so that the sample appears visually solid at a given distance). For 50% or more of participants to view a sample as appearing as one colour, the mean colour difference (DE) of the four blended primaries was found to be 20.8DE, 20.5DE and 18DE for fibre, yarn and knitted samples respectively. Delauney triangulation was then used to map the position, and number, of primaries required within a given area of colour space. It was found that to cover a large area of colour space, with primaries spaced no more than 18 CIELAB units apart, 150 primaries were required. If a smaller gamut is required then the number of primaries is reduced.

This work is significant as the results support the development of a blending system for pre-coloured fibre blends which has economic and environmental benefits compared to conventional dyeing techniques. A relatively small number of primaries can be blended in varying proportions to create a wide range of colours.

ABSTRACT

In order to create a commercial system for blending precoloured fibres that will appear visually solid once combined, it is necessary to understand the maximum colour difference required between the blend components. Based on this understanding, the lowest number of primaries required to populate a given colour gamut can be determined. A series of psychophysical experiments was carried out to explore the colour difference between fibre-blend components and whether the resulting blended samples are perceived as visually solid. Experiments were carried out with loose stock fibre, yarn and knitted samples. Generally, it was found that the likelihood a blend appeared as visually solid increased as the average colour difference between the blend components, or primaries, decreased. The value of the mean colour difference at which 50% of participants viewed the blend as being visually solid was found to be 20.8, 20.5 and 18.0 for fibre, yarn and knitted samples, respectively. Consequently, it was found that it was more difficult to obtain a solid shade with the knitted form than with the loose stock fibre form.

Keywords:
Fibre blending
Colouration technology

Links:

https://eprints.leedsbeckett.ac.uk/id/eprint/6120/11/BlendingSystemForPre-colouredFibresAM-HEMINGRAY.pdf

https://onlinelibrary.wiley.com/doi/10.1111/cote.12428

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